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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/012,210  
Filing Date: November 05, 2001  
Appellant(s): HELLRIEGEL ET AL.

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Harold H. Bennett II  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed January 19, 2007 appealing from the Office action mailed January 12, 2005.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The following are the related appeals, interferences, and judicial proceedings known to the examiner, which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,291,776	Markovick et al.	09-2001
3,977,074	Furnival, Thomas J.	08-1976

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4, 6-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Markovick et al. (U. S. Patent 6,291,776).

Regarding claims 1-2, Markovick discloses a device in figures 2-12 comprising:  
a flexible substrate (14, column 4, lines 31-32), a plurality of contact pads (12, column 4, line 31) on a first surface of the substrate (14) configured to make electrical

contact with contacts pads of a first circuit board, see figures 11-12, and a strain relief structure, which is an aperture (10), column 3, lines 6-14, 27-41, and column 4, lines 30-31), positioned between two of the pads, see figures 2-3, and penetrate through the flexible substrate.

Regarding claims 4, 6, Markovick discloses the strain relief structure (aperture 10) is a thinned region of the substrate (14), and is centered on a line between centers of two of the pads (12).

Regarding claims 7-8, Markovick discloses in **figure 6** further comprising a plurality of electrical traces (see a sketched of an attaching paper attached in the previous Office action), each of the traces being in electrical contact with one of the pads (12), and the strain relief structure (aperture 10) is positioned and interrupted one of the traces.

Regarding claims 9-10, 12-13, and 21, Markovick discloses a flexible connector and a method of manufacturing a flexible connector as shown in figures 2-12 comprising:

a flexible substrate (14), a plurality of contact pads (12) arranged in a first surface of the substrate (14);

a plurality of electrical traces (see the previous Office action) formed on either first and second surfaces or formed on an inner layer of the flexible substrate (14), each of the traces being in electrical contact with a respective one of the pads (12) and configured to provide an electrical coupling with a second/additional electrical connector, see figures 11-12; and

a plurality of apertures (10), see figure 6, each being function as a strain relief structure, penetrating through first and second surfaces of the substrate (14), the aperture (10) are arranged in a regular configuration and intercalated into the pads.

Regarding claim 11, Markovick discloses in figure 6 further including breaking one of the traces with the forming the strain relief step (apertures 10).

Regarding claims 14-15, Markovick discloses a flexible connector as shown in figures 2-12 comprising:

a flexible substrate (14), a plurality of contact pads (12) formed on a first surface of the substrate and arranged in a regular configuration in a contact region of the substrate (14); and

means for increasing flexibility comprises a plurality of apertures (10), see figure 6, intercalates with the pads (12) and penetrating from the first to a second surfaces of the substrate, the second surface is opposite to the first surface.

Regarding claim 16, Markovick discloses the means for increasing flexibility comprises a plurality of blind apertures (10), intercalates with the pads (626A-626C) and penetrating from the first surface to selected depth.

Regarding claim 17, Markovick discloses the means for increasing flexibility comprises a thinning of the flexible substrate (14) in the contact region, relative to a thickness of the substrate outside the contact region.

Regarding claims 18-20, Markovick discloses in figures 2-6 that each of the apertures (10) is configured to (intended used) to increase flexibility of the substrate,

see figures 4-5, and further comprising an additional electrical trace interrupted by one of the apertures, see figure 6.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Markovick ('776) in view of Furnival ('074) as shown in the record.

Regarding claims 3, 5, Markovick discloses all of the limitations of the claimed invention, except for the aperture having, in a plane view, a rectangular shape. Furnival shows a device as shown in figure 2 wherein the aperture (16) having a rectangular shape.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a rectangular shape aperture as taught by Furnival to employ in the device of Markovick in order to improve more spaces, which is inexpensive and more reliable, for an interfacial connection.

**(10) Response to Argument**

For the above reasons, it is believed that the rejections should be sustained.

**Applicant argues:**

(I) Regarding claims 1-3, and 6, Markovick fails to teach at least the cited elements as recited in claim 1, for example, (1) Markovick is silent "as to how the chip carrier if its disclose is to be so connected, being directly solely to the mounting of a chip to the chip carrier", (2) Markovick fails to teach "any feature configured to make electrical contact with a circuit board", (3) Markovick does not disclose "a flexible substrate"

Examiner disagrees. In the Office action mailed on 01/12/05, the examiner is addressed and clearly point out all of the limitations that the Markovick reference is clearly anticipated to read on the structure of the claimed language.

With respect to response of questions (1-3), Markovick discloses a chip carrier (14), which is a carrier for a chip, made of an organic material (see column 4, lines 31-32), the organic carrier (14) prior to being thermally deform, the carrier is inherently flexible to some degrees. Since the applicant does not specify how flexibly of the substrate, therefore, the carrier meets claim, so that the carrier being flexible and deformation during a solder reflow. The carrier (14) acts as an interface to connect to another device, a substrate, or a circuit board, see figures 11-12 (it is inherently and skill in the art to formed chip on a substrate or a board for forming packaging or semiconductor packaging), having pads (12) to contact pads (formed at a bottom of solder balls 16) of the circuit board/substrate, see figures 11-12.

Further, according to the specification on page 6, lines 21-22, the applicant is defined "a strain relief structure" being defined as "an aperture that extended through the substrate". So, there are plated through holes (PTH-10) in the Markovick

reference take positioned between each of the carrier's pads (12), the PTH (10) is an aperture extended through the carrier (14), see figures 4-5, hence, the PTH (10) acts as function and having structuring as a strain relief structure, see figures 2-5. Further in column 3, lines 9-41, Markovick actually says that this reduces strain compare to conventional usage as a hole whether it is more strain they do hole it does not matter.

Thus, Markovick discloses all of the limitations of claim 1. Therefore, Markovick is proper to anticipate all of the limitations of claim 1.

(II) Regarding claims 4-5, Markovick does not disclose "the strain relief structure being a thinned region".

Examiner disagrees because the applicant does not specific disclose (first) the size of the strain relief structure, and (second) how much thin it can be made.

As shown in figures 4b and 5b, Markovick discloses a BGA packaging comprising a chip carrier mounted on a printed circuit board or a substrate, the chip carrier having the PTH (10) formed in a thinned region after the carrier being reflow.

(III) Regarding claim 7. Markovick does not disclose the limitation as claimed in claim 7.

Examiner disagrees because as shown in figure 6, the Markovick shows one of a plurality of traces being electrical contact to one of the contact pads (12) of the carrier (14), and also the term "configured to", which is defined as "being capable" or "an

intended use", and not a positive claim language, therefore, the traces can be capable of being to place the respective contact pad (12) in an electrical contact with another device, such as a second circuit board.

(IV) Regarding claim 8, Mrakovick does not disclose the limitation of claim 8. Examiner disagrees because as can be shown in figure 6 of the Markovick reference, the strain relief structure (10) is positioned such that it interrupts one of the traces (figure 6, see the PTH (10) position between rows 5 and 6, and column J that interrupt one of the traces).

(V) Regarding claims 9 and 20, Markovick fails to disclose the limitation of "a flexible substrate."

Examiner disagrees. See the explanation of claim 1.

(VI) Regarding claim 18, Markovick does not disclose "each of the apertures is configured to increase flexibility of the substrate. Again, the term "configured to", which is "an intended use" or "capable of being" and not a positive claim structure, it means as "an adapted to" or "capable of being". Thus, Markovick disclose the PTH such as aperture (10) capable of being to increase flexure of the substrate (10).

(VII) Regarding claim 19, Markovick fails to disclose the limitations of claim 19.

Examiner disagrees because as shown in figure 6, between rows 5 and 6, and column J, the trace is electrically interrupt by one of the apertures (10).

(VIII) Regarding claims 10, 12-13. Markovick fail to disclose the limitations of the claims. Examiner disagrees. See the explanation of claim 1.

(IX) Regarding claim 11, Markovick does not disclose the step of "including breaking one of the electrical traces with the forming the strain relief structure."

Examiner disagrees. In figure 6 of the Markovick reference, it clearly shows (between rows 5 and 6, and column J) the trace being break by the strain relief structure (10).

(X) Regarding claims 14-15, Markovick fails to disclose the limitations of the claims.

Examiner disagrees because the term "mean for" acts as "a strain relief structure" or "an aperture", which is configured to increase a flexibility of the substrate, Markovick discloses in figures 2-12 that comprising a flexible connector (14) having pads (12) and a mean for function acts as an aperture or a strain relief structure (10) configured to increase the flexure of a substrate of the connector.

(XI) Regarding claim 16, Markovick does not disclose "mean for... comprises a plurality of blind hole"

It is incorrect, because the holes (10) are formed as blind holes for interconnecting the first board to the second board.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

Respectfully submitted,

*Tuan Dinh*



AM 2841

Conferees:

*Dean Reichard*



*Daren Schuberg*

